IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| Appellants: | Robert N. Mayo et al. | § | Confirmation No.: | 7375 |
| | | § | | |
| Serial No.: | 10/629,033 | § | Group Art Unit: | 2195 |
| | | § | | |
| Filed: | July 28, 2003 | § | Examiner: | Eric C. Wai |
| | | § | | |
| For: | Priority Analysis of Access Transactions in an Information System | § § § | Docket No.: | 200208396-1 |

# APPEAL BRIEF

**Mail Stop Appeal Brief – Patents** Date: February 1, 2008
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Appellants hereby submit this Appeal Brief in connection with the above-identified application. A Notice of Appeal was filed on December 05, 2007.

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## I. REAL PARTY IN INTEREST

The real party in interest is the Hewlett-Packard Development Company (HPDC), a Texas Limited Partnership, having its principal place of business in Houston, Texas. HPDC is a wholly owned affiliate of Hewlett-Packard Company (HPC).

## II. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any related appeals or interferences.

## III. STATUS OF THE CLAIMS

| | |
|---|---|
| Originally filed claims: | 1-18. |
| Added claims: | None. |
| Claim cancellations: | None. |
| Presently pending claims: | 1-18. |
| Presently appealed claims: | 1-18. |
| Presently allowed claims: | None. |
| Presently objected claims: | None. |

## IV. STATUS OF THE AMENDMENTS

There were no amendments filed subsequent to the final Office Action of October 18, 2007 (hereinafter "Office Action").

## V. SUMMARY OF THE CLAIMED SUBJECT MATTER

When operating a data center, it is sometimes desirable to reduce the power consumption of the information systems within the data center. This is desirable to reduce operating costs of the data center, and/or to reduce the overall heat in the data center environment. Specification of the subject application as filed (hereinafter "Specification"), p. 2, lines 1-10. The power consumption of an information system within a data center may be reduced by switching off individual access subsystems. Specification, p. 2, lines 13-15. However, switching off access subsystems can result in the loss of cached data, thus slowing down the overall response time in the information system. Specification, p. 2, lines 18-23. The analysis and assignment of incoming transactions to individual access subsystems may be used to minimize the loss of cached data during power reduction in an information system. Specification, p. 3, lines 1-9. Ranking the access subsystems within an information system, and routing an access transaction by matching the priority of the transaction to a ranking of an access subsystem is the subject of Appellants technological contribution.

In accordance with the invention of independent claim 1, for example, an information system is described that includes a set of access subsystems each for use in accessing a persistent store in the information system (Specification, p. 5, lines 12-17, and Fig. 1) and each having a corresponding priority rank (Specification, p. 6, lines 28-30). The priority rank determines the order in which certain system operations are performed, such as, for example, the order in which access subsystem are powered up or down, or placed in a reduced or full power state. Specification, p. 7, lines 6-27. The information system further includes a transaction analyzer (Specification, p. 5, lines 4-8, and Fig. 1) that determines a priority metric for an incoming access transaction to the persistent store (Fig. 2) and that transfers the incoming access transaction to one of the access subsystems by matching the priority metric to the priority ranks (Specification, p. 8, lines 4-9).

In accordance with the invention of independent claim 10, for example, a method for priority analysis of access transactions in an information system is described that includes determining a priority metric for an incoming access transaction to a persistent store in the information system (Specification, p. 8, lines 4-6, and Fig. 2). The method further includes selecting which of a set of access subsystems is to be used when performing the incoming access transaction by matching the priority metric to a priority rank for each access subsystem (Specification, p. 8, lines 7-9).

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

- Whether independent claims 1 and 10 are unpatentable over Ferguson et al. (U.S. Pat. No. 5,504,894, hereinafter "Ferguson") under 35 U.S.C. § 102(b).
- Whether dependent claims 2-3 and 11-12 are unpatentable over Ferguson in view of Yu (U.S. Pat. No. 6,807,572, hereinafter "Yu") under 35 U.S.C. § 103(a).
- Whether dependent claims 4-7 and 13-16 are unpatentable over Ferguson under 35 U.S.C. § 103(a).
- Whether dependent claims 8-9 and 17-18 are unpatentable over Ferguson in view of Stefanescu et al. (U.S. Pat. App. Pub. No. 2003/0013951, hereinafter "Stefanescu") under 35 U.S.C. § 103(a).

## VII. ARGUMENT

### A. Overview of Ferguson

Ferguson is directed to a multiple processor transaction processing system, wherein a transaction is routed to one of a number of transaction servers (also referred to in Ferguson as back-end processors or BEPs[1]) based upon which server has the best overall goal satisfaction index. Ferguson, Abstract. A plurality of transaction classes are established, as well as a response time goal for each transaction class. Ferguson, col. 2, lines 65-67. Each transaction class is a grouping of transactions based on a variety of characteristics. Ferguson, col. 3, lines 1-2. A performance index is associated with each transaction class and represents the goal satisfaction index of the class. This performance index is essentially the current average transaction class response time divided by the response time goal for the class. Ferguson, col. 5, lines 58-62. If the average response time for the transaction class is less than or equal to the response time goal for the class (*i.e.*, the performance index is less than or equal to one), then the transaction class is meeting its goal. Smaller performance indices imply better performance and goal satisfaction. Ferguson, col. 5, lines 62-64.

When a transaction arrives, a predicted performance index is calculated for each transaction class on a transaction server, reflecting the predicted performance impact of routing the transaction to the transaction server. The prediction is repeated for all transaction servers to which the transaction may be routed. Ferguson, col. 3, lines 18-27. The result is an array of performance indices P (*j*, *l*) (Ferguson. Col. 6, lines 21-24), where *j* is an arbitrary class identifier and *l* is a transaction server identifier (Ferguson, col. 6, line 11). Each element of the array is a performance index P (*j*, *l*) that reflects the performance of class *j* if the transaction is routed to transaction server *l*. Ferguson, col. 6, lines 20-35. A min-max function is applied to the performance index array to identify the transaction server to which the transaction is to be routed.

[1] *See* Ferguson, col. 5, lines 1-2.

Ferguson, col. 6, lines 36-40. The min-max function determines which of the worst performance indices of each class is the smallest (*i.e.*, the index associated with the routing that causes the lowest, worse-case performance impact among the transaction classes). Ferguson, col. 3, lines 30-36.

The application of the min-max function to the array of performance indices results in a policy that attempts to make all performance indices equal, and as small as possible. The policy attempts to prevent one transaction class from achieving response times far below its goal if achieving such response times would result in degrading the performance of another transaction class that is exceeding its goal. Ferguson, col. 6, lines 41-45.

**B. Independent Claims 1 and 10**

In rejecting independent claim 1 as allegedly anticipated by Ferguson, the Examiner stated that Ferguson teaches, among other things, "a set of access subsystems… each having a corresponding priority rank (col 2 lines 30-35, and lines 55-61, wherein the subsystems/processors are ranked according to access time to records)…" Office Action, pp. 3-4, ¶ 6. Appellants respectfully traverse the Examiner's characterization of the cited art, noting that Ferguson does not teach or even suggest a set of access subsystems "each having a corresponding priority rank," as required by independent claim 1.

With regard to the Examiner's allegation that Ferguson teaches a set of subsystems/processors that are ranked according to access time to records, Appellants respectfully note that the passages cited by the Examiner in support of this assertion state:

> Another object is to provide such a workload manager in which the workload is balanced among the processors in said system so as to minimize a response time dissatisfaction performance index for the class of transactions that is being satisfied the poorest relative to its individual response time goal…
>
> It is also an object to achieve such workload balancing while advantageously taking into account that transactions of a particular class execute more efficiently on a processor that has quicker average access to records needed by a transaction of that class

> than on another processor that has slower average access to the records needed by a transaction of that class.

Ferguson, col. 2, lines 30-35 and 55-61. The first passage merely describes balancing the workload among the processors in the system described in order to minimize the amount by which the average transaction response time for the poorest performing transaction class exceeds the response time goal for the class, as previously described (*i.e.*, using a min-max function). No mention is made of ranking <u>any</u> of the processors, let alone each of the processors. The second passage merely states that the balancing previously described <u>takes into account</u> that transactions of a class execute more efficiently on a processor with a quicker average access to records. No mention is made of ranking each of the processors according to record access times, or according to any other criteria. In fact, no mention is made at all of ranking the processors. Appellants respectfully submit that the priority rank associated with each access subsystem of claim 1 is not taught or even suggested in the cited passage, nor anywhere else within Ferguson.

The Examiner further alleged that Ferguson teaches a "transaction analyzer that determines a priority metric for an incoming transaction to the persistent store and that transfers the incoming access transactions to one of the access subsystems by matching the priority metric to the priority ranks (col 3 lines 18-30, wherein the workload manager determines the response time goals and matches it the resource that can meet those goals)." Office Action, p. 4, ¶ 6. Appellants again traverse the Examiner's characterization of the cited art, noting that Ferguson teaches a series of complex calculations that are used to determine a predicted average performance index that is associated with a <u>class</u> of transactions, and it is this predicted average <u>class</u> performance index that is used to determine the routing of an individual transaction. *See* Ferguson, col. 5, lines 48-67 through col. 6, lines 1-47 and Overview of Ferguson above. The routing is thus not determined by matching a priority metric of an <u>individual transaction</u> with a corresponding priority ranking of an access subsystem.

Appellants therefore respectfully submit that Ferguson does not teach or even suggest determining "a priority metric for an incoming transaction," nor transferring the transaction to an access subsystem "by matching the priority metric to the priority ranks," as required by independent claim 1. Appellants further respectfully submit that the emphasis throughout Ferguson on the use of a transaction class <u>average</u> performance index as a basis for routing a transaction teaches *away* from the use of individual performance indices as a basis for routing a transaction.

Appellants thus respectfully submit that for at least the reasons presented above, Ferguson does not teach or even suggest all of the limitations of independent claim 1, and thus does not anticipate the claim under 35 U.S.C. § 102(b). Further, none of the cited art, either alone or together, overcomes the deficiencies of Ferguson.

Regarding the rejection of independent claim 10, Appellants respectfully note that independent claim 10 includes limitations similar to the limitations of claim 1 discussed above. Appellants thus respectfully submit that for at least the same reasons as those presented above with regard to independent claim 1, Ferguson does not teach or suggest all of the limitations of independent claim 10.

Because Ferguson does not teach or suggest all of the limitations of either independent claim 1 or independent claim 10, and because none of the cited art, either alone or together, overcome the deficiencies of Ferguson, Appellants respectfully submit that the Examiner has failed to support that these claims are anticipated by Ferguson. Appellants therefore respectfully submit that the Examiner erred in rejecting independent claims 1 and 10 under 35 U.S.C. § 102(b), and thus respectfully request reversal of the rejections of these claims.

### C. Dependent Claims 2-3 and 11-12

Regarding the rejection of dependent claims 2-3 and 11-12 as allegedly obvious over Ferguson in view of Yu, Appellants respectfully note that because

these claims include all of the limitations of independent claim 1 and independent claim 10, respectively, and because none of the cited art, either alone or together, teaches or even suggest all of the limitations of claim 1 or claim 10 for at least the reasons presented above, dependent claims 2-3 and 11-12 are not rendered obvious over the cited art. Appellants therefore respectfully submit that the Examiner erred in rejecting dependent claims 2-3 and 11-12 under 35 U.S.C. 103(a), and thus respectfully request reversal of the rejections of these claims.

**D. Dependent Claims 4-7 and 13-16**

Regarding the rejection of dependent claims 4-7 and 13-16 as allegedly obvious over Ferguson, Appellants respectfully note that because these claims include all of the limitations of independent claim 1 and independent claim 10, respectively, and because none of the cited art, either alone or together, teaches or even suggest all of the limitations of claim 1 or claim 10 for at least the reasons presented above, dependent claims 4-7 and 13-16 are not rendered obvious over the cited art. Appellants therefore respectfully submit that the Examiner erred in rejecting dependent claims 4-7 and 13-16 under 35 U.S.C. 103(a), and thus respectfully request reversal of the rejections of these claims.

**E. Dependent Claims 8-9 and 17-18**

Regarding the rejection of dependent claims 8-9 and 17-18 as allegedly obvious over Ferguson in view of Stefanescu, Appellants respectfully note that because these claims include all of the limitations of independent claim 1 and independent claim 10, respectively, and because none of the cited art, either alone or together, teaches or even suggest all of the limitations of claim 1 or claim 10 for at least the reasons presented above, dependent claims 8-9 and 17-18 are not rendered obvious over the cited art. Appellants therefore respectfully submit that the Examiner erred in rejecting dependent claims 8-9 and 17-18 under 35 U.S.C. 103(a), and thus respectfully request reversal of the rejections of these claims.

## VIII. CONCLUSION

For the reasons stated above, Appellants respectfully submit that the Examiner erred in rejecting claims 1-18 and that these claims are all in condition for allowance. Appellants thus respectfully request reversal of the rejections. It is believed that no extensions of time or fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required (including fees for net addition of claims) are hereby authorized to be charged to Hewlett-Packard Development Company's Deposit Account No. 08-2025.

Respectfully submitted,

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## IX. CLAIMS APPENDIX

Claims on Appeal:

1. (Previously presented) An information system, comprising:

a set of access subsystems each for use in accessing a persistent store in the information system and each having a corresponding priority rank;

transaction analyzer that determines a priority metric for an incoming access transaction to the persistent store and that transfers the incoming access transaction to one of the access subsystems by matching the priority metric to the priority ranks.

2. (Previously presented) The information system of claim 1, wherein the priority metric is based on a frequency of occurrence for the incoming access transaction.

3. (Previously presented) The information system of claim 1, wherein the priority metric is based on a frequency of access of a database table referenced in the incoming access transaction.

4. (Previously presented) The information system of claim 1, wherein the priority metric is based on a dollar cost associated with the incoming access transaction.

5. (Previously presented) The information system of claim 1, wherein the priority metric is based on a computational complexity associated with performing the incoming access transaction.

6. (Original) The information system of claim 5, wherein the computational complexity is indicated by a number of database tables in the persistent store that are referenced by the incoming access transaction.

7. (Original) The information system of claim 5, wherein the computational complexity is indicated by a number of field matches specified in the incoming access transaction to database tables in the persistent store.

8. (Previously presented) The information system of claim 1, wherein the priority metric is based on a set of query constraints contained in the incoming access transaction.

9. (Original) The information system of claim 8, wherein the priority metric is based on a size of a database table in the persistent store to which the query constraints are to be applied.

10. (Previously presented) A method for priority analysis of access transactions in an information system, comprising:

determining a priority metric for an incoming access transaction to a persistent store in the information system;

selecting which of a set of access subsystems is to be used when performing the incoming access transaction by matching the priority metric to a priority rank for each access subsystem.

11. (Previously presented) The method of claim 10, wherein determining the priority metric includes determining a frequency of occurrence for the incoming access transaction.

12. (Previously presented) The method of claim 10, wherein determining the priority metric includes determining a frequency of access of a database table referenced in the incoming access transaction.

13. (Previously presented) The method of claim 10, wherein determining the priority metric includes determining a dollar cost associated with the incoming access transaction.

14. (Previously presented) The method of claim 10, wherein determining the priority metric includes determining a computational complexity associated with performing the incoming access transaction.

15. (Original) The method of claim 14, wherein the computational complexity is indicated by a number of database tables in the persistent store that are referenced by the incoming access transaction.

16. (Original) The method of claim 14, wherein the computational complexity is indicated by a number of field matches specified in the incoming access transaction to database tables in the persistent store.

17. (Previously presented) The method of claim 10, wherein determining the priority metric includes determining the priority metric in response to a set of query constraints contained in the incoming access transaction.

18. (Previously presented) The method of claim 17, wherein determining the priority metric includes determining a size of a database table in the persistent store to which the query constraints are to be applied.

## X. EVIDENCE APPENDIX

Not applicable in the present appeal.

## XI. RELATED PROCEEDINGS APPENDIX

Not applicable in the present appeal.